H3C AR 18-2X Series Routers
Installation Manual

Hangzhou H3C Technologies Co., Ltd.

http://www.h3c.com

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About This Manual

Related Documentation

In addition to this manual, each AR 18-2X Series Routers documentation set includes the following:

Manual	Content
Comware V3 Operation Manual	The manual is a guide for the user to perform the operations correctly. It is organized into the parts of getting started, system management, interface, link layer protocol, network protocol, routing protocol, multicast protocol, security, VPN, reliability, QoS, MPLS, dial-up and Non-IP Architecture, as well as acronyms used in the manual.
Comware V3 Command Manual	The manual gives the user a detailed description of the operating commands. It is organized into the parts of getting started, system management, interface, link layer protocol, network protocol, routing protocol, multicast protocol, security, VPN, reliability, QoS, MPLS, dial-up and Non-IP Architecture, as well as a command index.

Manual	Content
Low-End and Mid-Range Series Routers Terminal Access User Manual	This manual covers all interface cards and modules available with H3C AR Series Routers, including the cable pinouts, function, interface attribute, panels and LEDs.
LMR Series Routers Cable Manual	This manual introduces all cable pinouts available with LMR series routers.

Organization

H3C AR 18-2X Series Routers Installation Manual is organized as follows:

Chapter	Contents
1 Product Overview	Hardware Features of H3C AR 18-2X Series Routers
2 Installing the Router	Introduces the installation requirements, the issues needed to be considered and the installation tools needed for the installation of the AR 18-2X Series Routers.
3. Starting and Maintaining the Router	Covers the configuration and software maintenance of the H3C AR 18-2X Series Routers, including software upgrade and the application program upgrade.
4. Troubleshooting	Lists the problems and checkup methods when H3C AR 18-2X Series Routers are installed.

Conventions

The manual uses the following conventions:

I. Command conventions

Convention	Description
Boldface	The keywords of a command line are in **Boldface**.
italic	Command arguments are in *italic*.
[ ]	Items (keywords or arguments) in square brackets [ ] are optional.
{ x | y | ... }	Alternative items are grouped in braces and separated by vertical bars. One is selected.
[x | y | ...]	Optional alternative items are grouped in square brackets and separated by vertical bars. One or none is selected.
{ x | y | ... } *	Alternative items are grouped in braces and separated by vertical bars. A minimum of one or a maximum of all can be selected.
[x | y | ...] *	Optional alternative items are grouped in square brackets and separated by vertical bars. Many or none can be selected.
&<1-n>	The argument(s) before the ampersand (&) sign can be entered 1 to n times.
#	A line starting with the # sign is comments.

II. GUI conventions

Convention	Description
< >	Button names are inside angle brackets. For example, click <OK>.
[ ]	Window names, menu items, data table and field names are inside square brackets. For example, pop up the [New User] window.
/	Multi-level menus are separated by forward slashes. For example, [File/Create/Folder].

III. Symbols

Convention	Description
 Warning	Means reader be extremely careful. Improper operation may cause bodily injury.
 Caution	Means reader be careful. Improper operation may cause data loss or damage to equipment.
🕮 Note	Means a complementary description.

Environmental Protection

This product has been designed to comply with the requirements on environmental protection. For the proper storage, use and disposal of this product, national laws and regulations must be observed.

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Chapter 1 Product Overview

1.1 Introduction

H3C AR 18-2X Series Routers (hereinafter referred to as the AR 18-2X series) are Ethernet access routers designed for small office home office (SOHO) subscribers. By far, the series have six models: AR 18-21/18-22/18-22-8/18-22S-8/18-23-1/18-23S-1. They provide an uplink Ethernet interface and four downlink layer 2 (L2) switched 10/100BASE-T Ethernet interfaces that can be isolated.

The AR 18-2X series support multiple virtual private network (VPN) services, such as layer 2 tunneling protocol (L2TP) VPN, IP security (IPSec) VPN, generic routing encapsulation (GRE) VPN, and dynamic VPN (DVPN). They can provide tunnel connections to remote users to build VPNs that can be internets, intranets, or access networks.

The series support firewall, AAA (authentication, authorization, accounting), network address translation (NAT), and quality of service (QoS). Therefore, they can ensure security and guaranteed services to the private networks constructed on the open Internet.

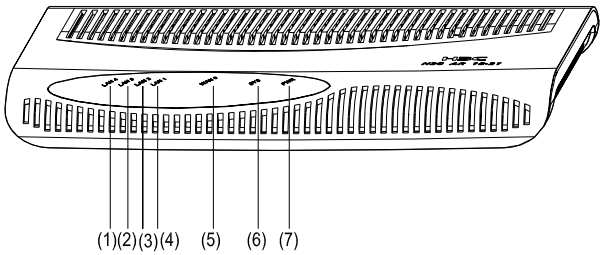
In the series the AR 18-22S-8 and AR 18-23S-1 has a build-in hardware encryption chip, which can significantly improve encryption performance.

The interfaces that the AR 18-2X series provide are compliant with the international standards and can work with the products of other vendors at every layer. The existing investment of users can thus be protected to the maximum.

1.2 Hardware Features of the AR 18-2X

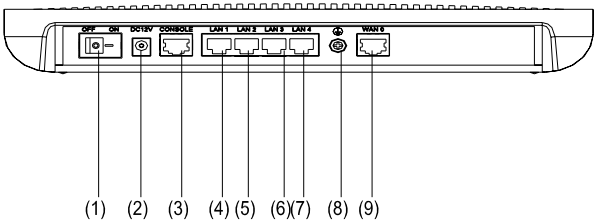
1.2.1 Hardware Features of the AR 18-21

I. Appearance



1) Ethernet LED LAN4
2) Ethernet LED LAN3
3) Ethernet LED LAN2
4) Ethernet LED LAN1
5) WAN LED (WAN0)
6) SYSTEM LED (SYS)
7) POWER LED (PWR)

Figure 1-1 Front view of the AR 18-21



1) Power switch
2) Power socket
3) Console port (CONSOLE)
4) Ethernet interface 1 (LAN1)
5) Ethernet interface 2(LAN2)
6) Ethernet interface 3 (LAN3)
7) Ethernet interface 4 (LAN4)
8) Grounding screw
9) WAN interface (WAN0)

Figure 1-2 Rear view of the AR 18-21

II. System specifications

Table 1-1 System specifications of the AR 18-21

Item		AR 18-21
Interface		1 console port 1 x 10/100 Mbps Ethernet interface (WAN) 4 x 10/100 Mbps Ethernet interfaces (LAN)
Processor		MPC8247
SDRAM		64 MB
Flash		8 MB
Hardware encryption		—
Max. power		10 W
Power supply (external)	Input	Rated voltage: 100 to 240 VAC; 50 to 60 Hz Current: 0.5 A
	Output	Voltage: 12 VDC Current: 1.25 A
Dimensions (W x D x H)		300 x 180 x 45 mm (11.81 x 7.09 x 1.77 in.) (the maximum measurements, including the bulge)
Weight		1kg (2.20 lb)
Operating temperature		0 to 40 C (32 to 104 F)
Relative humidity (non-condensing)		5 to 90%

III. LEDs

You can gather information about the status of the AR 18-21 and its interfaces by reading the seven LEDs on its cover, as shown below.

Table 1-2 LEDs on the cover of the AR 18-21

LED	Description
LAN1/LAN2/ LAN3/LAN4/ WAN0	OFF means no link is present. ON means a link is present. Blinking means data is being sent or/and received.
SYS	Blinking means the system is operating normally. Steady ON or OFF means the system is improperly operating.
PWR	OFF means no power is being supplied. ON means power is being supplied.

IV. Interface attributes

The interfaces that the AR 18-21 provides are described as follows:

1) Console port

Table 1-3 Attributes of the console port

Attribute	Description
Connector	RJ45
Interface standard	Asynchronous RS232
Baud rate	9600 (default) to 115200 bps

Attribute	Description
Service	Connection to an ASCII terminal Connection to the serial interface on a PC to run the terminal emulation program on the PC Command line interface (CLI)

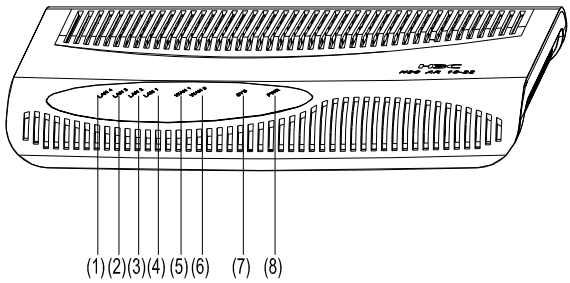
2) Ethernet interface

Table 1-4 Attributes of the Ethernet interface

Attribute	10BASE-T	10/100BASE-T
Connector	RJ45	
Interface type	MDI/MDIX autosensing	
Operating mode	10 Mbps Full duplex/half duplex	10/100 Mbps autosensing Full duplex/half duplex Supports only L2 switching

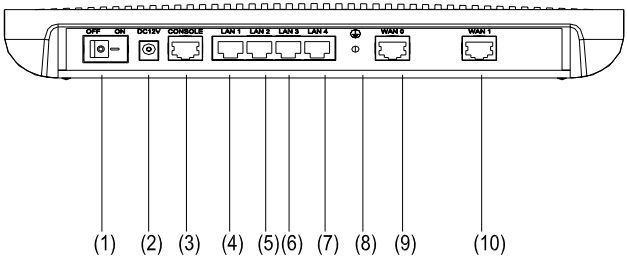
1.2.2 Hardware Features of the AR 18-22

I. Appearance



1) Ethernet LED LAN4
2) Ethernet LED LAN3
3) Ethernet LED LAN2
4) Ethernet LED LAN1
5) WAN LED (WAN1)
6) WAN LED (WAN0)
7) SYSTEM LED (SYS)
8) POWER LED (PWR)

Figure 1-3 Front view of the AR 18-22



1) Power switch
2) Power socket
3) Console port (CONSOLE)
4) Ethernet interface 1 (LAN1)
5) Ethernet interface 2(LAN2)
6) Ethernet interface 3 (LAN3)
7) Ethernet interface 4 (LAN4)
8) Grounding screw
9) WAN interface (WAN0)
10) WAN interface (WAN1)

Figure 1-4 Rear view of the AR 18-22

II. System specifications

Table 1-5 System specifications of the AR 18-22

Item		AR 18-22
Interface		1 console port 2 x 10/100 Mbps Ethernet interface (WAN) 4 x 10/100 Mbps Ethernet interfaces (LAN)
Processor		MPC8247
SDRAM		64 MB
Flash		8 MB
Hardware encryption		—
Max. power		10 W
Power supply (external)	Input	Rated voltage: 100 to 240 VAC; 50 to 60 Hz Current: 0.5 A
	Output	Voltage: 12 VDC Current: 1.25 A
Dimensions (W x D x H)		300 x 180 x 45 mm (11.81 x 7.09 x 1.77 in.) (the maximum measurements, including the bulge)
Weight		1kg (2.20 lb)
Operating temperature		0 to 40 C (32 to 104 F)
Relative humidity (non-condensing)		5 to 90%

III. LEDs

You can gather information about the status of the AR 18-22 and its interfaces by reading the eight LEDs on its cover, as shown below.

Table 1-6 LEDs on the cover of the AR 18-22

LED	Description
LAN1/LAN2/LAN3/LAN4/WAN0/WAN1	OFF means no link is present. ON means a link is present. Blinking means data is being sent or/and received.
SYS	Blinking means the system is operating normally. Steady ON or OFF means the system is improperly operating.
PWR	OFF means no power is being supplied. ON means power is being supplied.

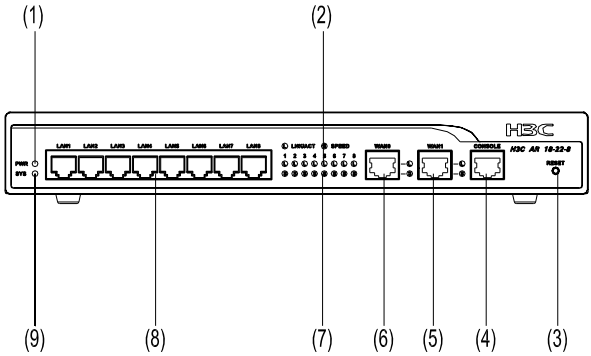
IV. Interface attributes

The AR 18-22 provides a consol port and 10/100 Mbps Ethernet interfaces. Refer to 1.2.1 IV. for attributes detail.

The WAN1 interface supports only MDI other than MDI/MDIX autosensing. Other Ethernet interfaces share the same attributes with the AR 18-21.

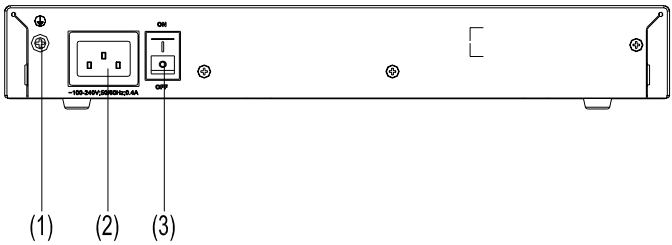
1.2.3 Hardware Features of the AR 18-22-8/18-22S-8

I. Appearance



1) POWER LED (PWR)
2) Connection LEDS of Ethernet Interfaces LAN1-LAN8 (LINK/ACT)
3) Reset
4) Console Port
5) WAN Port (WAN1)
6)WAN Port (WAN0)
7) Speed LEDs of Ethernet Interfaces LAN1-LAN8 (SPEED)
8) Layer2 Ethernet Interfaces LAN1-LAN8
9) SYSTEM LED (SYS)

Figure 1-5 Front view of the AR 18-22-8/18-22S-8



1) Grounding screw 2) Power socket 3) Power switch

Figure 1-6 Rear view of the AR 18-22-8/18-22S-8

II. System specifications

Table 1-7 System specifications of the AR 18-22-8/18-22S-8

Item		AR 18-22-8	AR 18-22S-8
Interface		1 console port 2 x 10/100 Mbps Ethernet interface (WAN) 8 x 10/100 Mbps Ethernet interfaces (LAN)	
Processor		MPC8248	
SDRAM		64 MB	128 MB
Flash		8 MB	16 MB
Hardware encryption		—	Supported
Max. power		10 W	
Input voltage and current	AC	Rated voltage: 100 to 240 VAC; 50 to 60 Hz Current: 0.5 -1 A	
Dimensions (W x D x H)		300 x 225 x 42 mm (11.81 x 8.85 x 1.65 in.) (the maximum measurements, including the bulge)	
Weight		2kg (4.40 lb)	
Operating temperature		0 to 40 C (32 to 104 F)	
Relative humidity (non-condensing)		5 to 90%	

III. LEDs

You can gather information about the status of the AR 18-22-8/18-22S-8 and its interfaces by reading the twenty-two LEDs on its cover, as shown below. Every LAN/WAN interface has LEDs LINK/ACT and SPEED to indicate its running state.

Table 1-8 LEDs on the cover of the AR 18-22-8/18-22S-8

LED		Description
LAN1/LAN2/LAN3/LAN4/LAN5/LAN6/LAN7 LAN8/WAN0/WAN1	LINK/ACT	OFF means no link is present. ON means a link is present. Blinking means data is being sent or/and received.
	SPEED	OFF means the link rate is 10 Mbps. ON means the link rate is 100 Mbps.
SYS		Blinking means the system is operating normally. Steady ON or OFF means the system is improperly operating.
PWR		OFF means no power is being supplied. ON means power is being supplied.

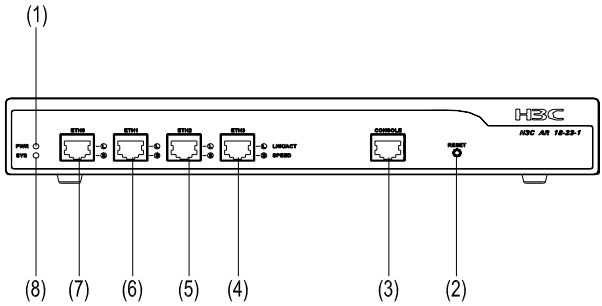
IV. Interface attributes

The AR 18-22-8/18-22S-8 provides a consol port and 10/100 Mbps Ethernet interfaces. Refer to 1.2.1 IV. for attributes detail.

The WAN1 interface supports only MDI other than MDI/MDIX autosensing. Other Ethernet interfaces share the same attributes with the AR 18-21.

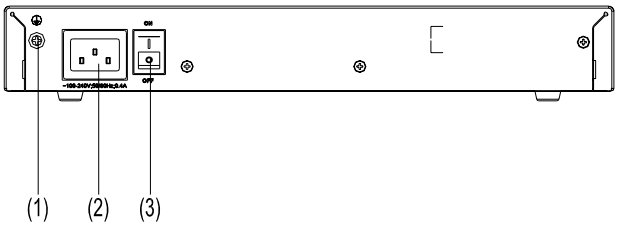
1.2.4 Hardware Features of the AR 18-23-1/18-23S-1

I. Appearance



1) POWER LED (PWR)
2) Reset
3) Console Port (CONSOLE)
4) Ethernet Interface ETH0
5) Ethernet Interface ETH1
6) Ethernet Interface ETH2
7) Ethernet Interface ETH3
8) SYSTEM LED (SYS)

Figure 1-7 Front view of the AR 18-23-1/18-23S-1



1) Grounding screw
2) Power socket
3) Power switch

Figure 1-8 Rear view of the AR 18-23-1/18-23S-1

II. System specifications

Table 1-9 System specifications of the AR 18-23-1/18-23S-1

Item		AR 18-23-1	AR 18-23S-1
Interface		1 console port 4 x 10/100 Mbps Ethernet interface	
Processor		MPC8248	
SDRAM		64 MB	128 MB
Flash		8 MB	16 MB
Hardware encryption		—	Supported
Max. power		10 W	
Input voltage and current	AC	Rated voltage: 100 to 240 VAC; 50 to 60 Hz Current: 0.5 -1 A	
Dimensions (W x D x H)		300 x 225 x 42 mm (11.81 x 8.85 x 1.65 in.) (the maximum measurements, including the bulge)	
Weight		2kg (4.40 lb)	
Operating temperature		0 to 40 C (32 to 104 F)	
Relative humidity (non-condensing)		5 to 90%	

III. LEDs

You can gather information about the status of the AR 18-23-1/18-23S-1 and its interfaces by reading the ten LEDs on its cover, as shown below.

Table 1-10 LEDs on the cover of the AR 18-23-1/18-23S-1

LED		Description
ETH0/ ETH1/ ETH2/ ETH3	LINK/ACT	OFF means no link is present. ON means a link is present. Blinking means data is being sent or/and received.
	SPEED	OFF means the link rate is 10 Mbps. ON means the link rate is 100 Mbps.
SYS		Blinking means the system is operating normally. Steady ON or OFF means the system is improperly operating.
PWR		OFF means no power is being supplied. ON means power is being supplied.

IV. Interface attributes

The AR 18-23-1/18-23S-1 provides a consol port and 10/100 Mbps Ethernet interfaces. Refer to 1.2.1 IV. for attributes detail.

The ETHO/ETH1 interface supports only MDI other than MDI/MDIX autosensing. Other Ethernet interfaces share the same attributes with the AR 18-21.

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Chapter 2 Installing the Router

2.1 Safety Precautions

Caution:

Observe the safety precautions in this section when installing or maintaining your router to avoid bodily injuries or device impairment caused by improper actions.

- Maintain an indoor temperature in the range 0 to 40 C (32 to 104 F) and a humidity level in the range 5 to 90%.
- Keep the router away from radio transmitting stations, radar stations, and high-frequency devices. Use electromagnetic shielding if necessary.
- Do not put the router on an unstable table or platform.
- Make sure that the rack/workbench has a good ventilation system and is properly grounded.
- Wear an ESD-preventive wrist strap during installation, making sure that it has good skin-contact.
- Reserve adequate clearance at the air intake and exhaust vents for ventilation.
- For power supply, use a single-phase three-line power socket with a neutral point or use a universal PC power

socket, making sure that the neutral point is well connected to building ground.

- Make sure the correct voltage is used.
- Put a lightning arrester at the front end of the power input to enhance its lightning protection. To this end, put a special lightning arrester at the front end of signal cables that are led outdoors, such as ISDN, telephone, and T1 cables.
- Do not open the chassis when the router is operating or when electricity hazards are present to avoid electrical shocks. Before you open the chassis, obtain the permission of your sales agent.
- Correctly connect the interface cables. Do not connect a telephone cable (including the ISDN cable) to a serial port.
- Do not hot swap any cable.

2.2 Installing the Router

You can place your router on a sturdy tabletop or workbench, mount it on a vertical surface, or install it on a rack.

2.2.1 Placing the Router on a Tabletop/Workbench

When placing the router on a tabletop or workbench,

- Make sure that the tabletop or workbench is clean, flat, and sturdy.
- Allow 10 cm (3.9 in.) of clearance around the sides of the chassis.
- Do not stack multiple routers together.

2.2.2 Mounting the Router on a Vertical Surface

Mount the router on a vertical surface with four pan-head screws and the four brackets at the bottom of the router.

Caution:

- Securely anchor these four mounting screws in the vertical surface. If the screws are not properly anchored, strain of the network cable connections can pull the router from the wall.
- Install the router in such a position that the LEDs can be read easily.
- Securely fix the external power supply unit of the router, preventing the power cord from falling down.

Follow these steps to mount the router on a wall or other vertical surface:

Step 1: Install four pan-head screws on a wall or other flat vertical surface (with reference to the distance between the four brackets as shown in Figure 2-1), and ensure that each screw sticks out 6 mm (0.24 in.) on the wall.

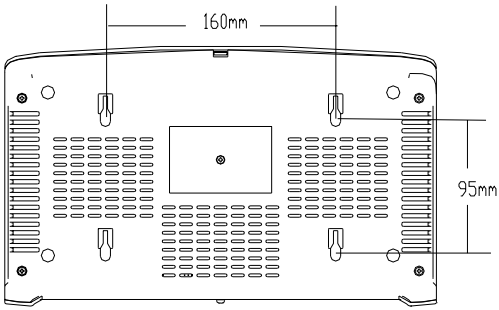


Figure 2-1 Chassis bottom

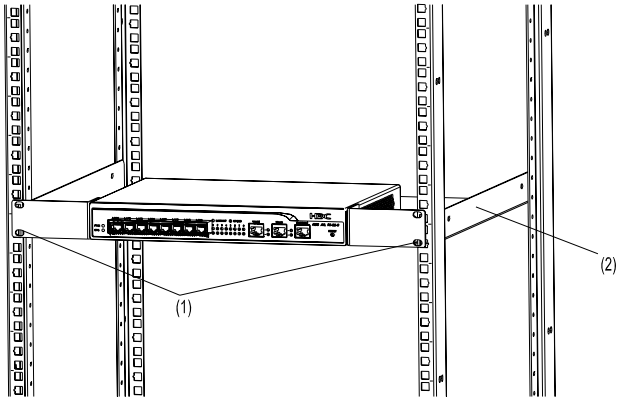
Step 2: Hang the router on the screws by the four brackets.

2.2.3 Installing the Router in a Rack

The AR 18-22-8, AR 18-22S-8, AR 18-23-1, AR 18-23S-1 can be installed in a 19 inch rack.

The following are Installation steps.

1) Check the stability and grounding of the rack. Use screws to install rack-mounting ears on the router's front or rear cover.
2) Place the router on a pallet of the rack and slide it to a proper position. Keep a proper distance between the router and slides.
3) Use rustproof pan head screws to fix the rack-mounting ears to the rack, keeping the router horizontal.



1) Fixing the rack-mounting ears 2) Fixing the slides

Figure 2-2 AR 18-2X installation in a rack

2.3 Connecting the Ground Wire

Caution:

Properly connect the ground wire before connecting other cables and shorten it as much as possible to prevent the router and the connected device from getting damaged during periods of lightning activities.

The grounding screw of the chassis PGND is located on the rear panel. Connect this screw to the earth ground using a ground wire. The grounding resistance must not be greater than 5-ohm.

2.4 Connecting the Power Cord

I. AC-input power supply

For the AR 18-2X series, an external AC-input power supply is provided with these specifications:

Input rated voltage: 100 to 240 VAC, 50 to 60 Hz

Input current: 0.5 to 1A

Output voltage: 12 VDC

Output current: 1.25 A

Figure 2-3 illustrates the power supply:

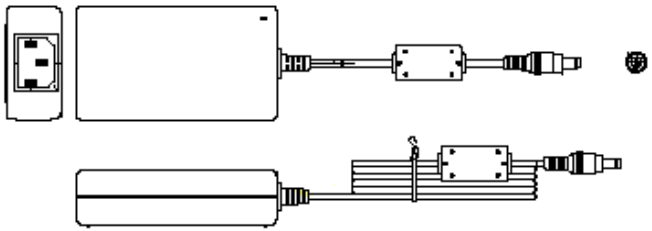


Figure 2-3 Power supply

II. Connecting the AC-input power cord

Step 1: Put the power switch of the router in OFF position.

Step 2: Connect the output of the power supply to the power input on the rear panel of the router, and then insert the input connector of the power supply into an AC power outlet.

Step 3: Put the power switch of the router in ON position.

Step 4: Check that the PWR LED on the front panel of the router is ON. If the LED is OFF, repeat steps 2 through 4.

Caution:

If the PWR LED is still off after you repeat steps 2 through 4 several times, refer to “Chapter 4 Troubleshooting” for a solution.

2.5 Connecting the Router to a Console Terminal

I. Console cable

The console cable has an RJ45 connector at one end and a DB9 (female) connector at the other end.

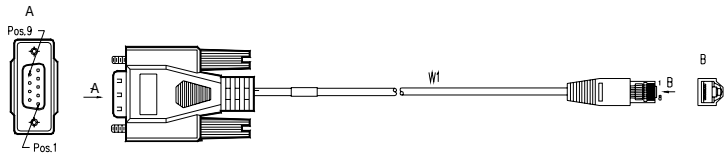


Figure 2-4 Console cable assembly

II. Connecting the console cable

Follow these steps to connect the router to a console terminal:

Step 1: Select a console terminal.

The console terminal can be either a standard ASCII terminal with an RS-232 serial interface or more commonly, a PC.

Step 2: Connect the console cable.

Power off the router and the console terminal, and then connect the RS-232 serial port on the console terminal to the console port on the router using the console cable.

Verify the connection and power on the router. In normal cases, the startup information is displayed on the terminal screen. For details, refer to “Chapter 3 Starting and Maintaining the Router”.

2.6 Connecting the Router to LAN

I. Ethernet cable

A 10/100Base-TX Ethernet interface is usually connected to an Ethernet using a category 5 twisted pair cable, as shown in Figure 2-5:

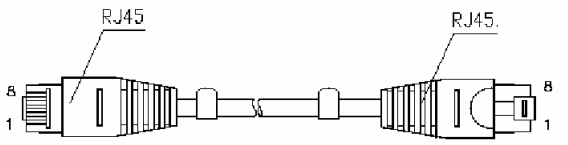


Figure 2-5 Ethernet cable assembly

Ethernet cables fit into two categories: straight-through and crossover.

- Straight-through cable, at both ends of which, the wires are crimped in the RJ45 connectors in the same sequence. The cable is used for connecting different types of devices, such as a terminal device (PC for example) or router to a Hub or LAN switch.
- Crossover cable, at both ends of which, the wires are crimped in the RJ 45 connectors in different sequence. The

cable is used for connecting the same type of devices, such as PC to PC or PC to router.

Caution:

In preparing network cables, shielded cables are preferred for the sake of electromagnetic compatibility.

II. Connecting an Ethernet cable

Caution:

Read the mark above the port to be connected carefully before making connection to make sure it is the right port.

The 10/100BASE-T interface on the AR18-2X series supports MDI/MDIX autosensing. Therefore, you can connect your router to another device using either straight-through cable or crossover cable without considering whether the two devices are of the same type.

You can simply connect one end of the network cable to the Ethernet port on the router and the other end to another device.

2.7 Verifying Installation

After you complete installation, verify that:

- The proper power supply is used.
- The grounding wire of the router is correctly connected.
- The console cable and the power cord are correctly connected.

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Chapter 3 Starting and Maintaining the Router

3.1 Starting up the Router

3.1.1 Setting up a Configuration Environment

I. Connecting the router to a console terminal

To set up a local configuration environment, simply connect the RJ45 connector of the console cable to the console port on the router, and the DB9 connector to the serial port on the console terminal, a PC for example, as shown in Figure 3-1.

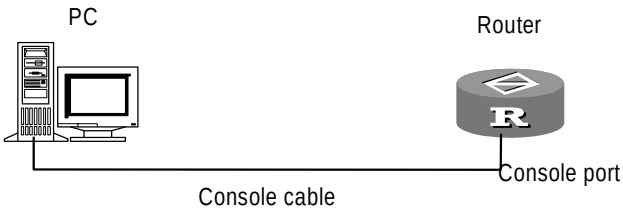

Figure 3-1 Local configuration through the console port

II. Setting terminal parameters

Follow these steps to set terminal parameters on the console terminal, a PC that runs Windows98 for example:

Step 1: Start the PC and select [Start/Programs/Accessories/ Communications/ HyperTerminal].

The HyperTerminal window displays the Connection Description dialog box, as shown in Figure 3-2.

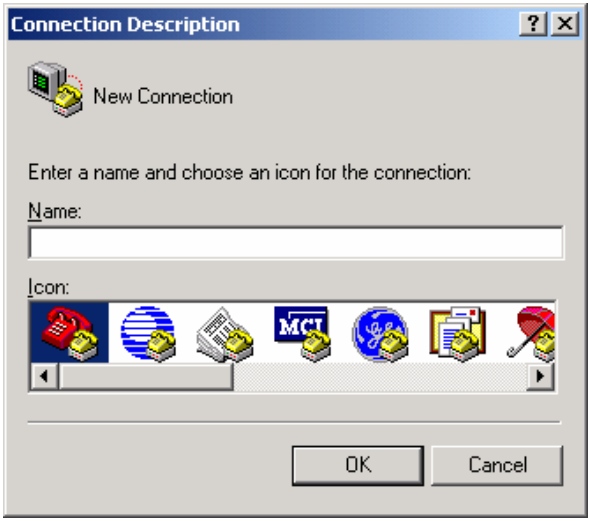

Figure 3-2 Setting up a new connection

Step 2: Enter the name of the new connection in the Name field and click <OK>. The dialog box, as shown in Figure 3-3, displays.

Step 3: Select the serial port to be used from the Connect Using dropdown menu. The serial port must be the same port connected by the console cable.

Figure 3-3 Setting the connection port

Step 4: Click <OK>. The Port Settings tab, shown in Figure 3-4, appears and you can set serial port parameters. Set the following parameters:

Baud rate = 9600

Databit = 8

Parity check = none

Stopbit = 1

Flow control = none

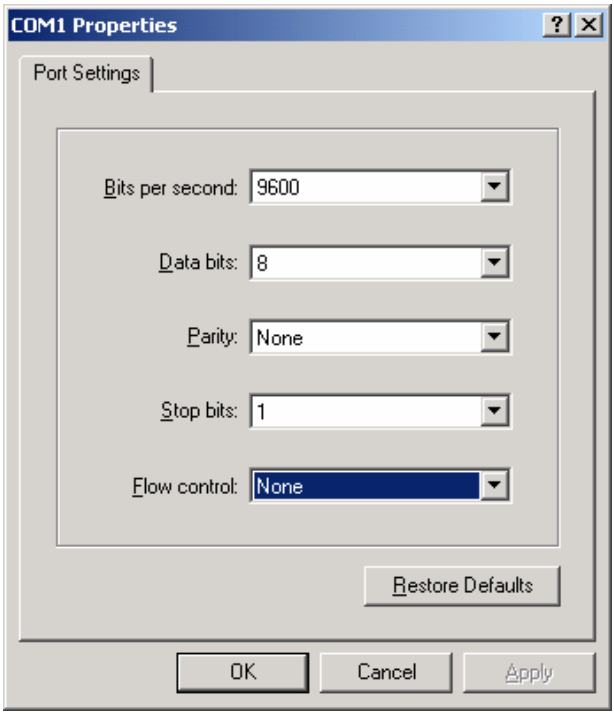

Figure 3-4 Setting communications parameters

Step 6: Click <OK>. The HyperTerminal dialogue box appears.

Step 7: Select Properties.

Step 8: In the Properties dialog box, select the Settings tab, as shown in Figure 3-5.

Step 9: Select VT100 or Auto detect in the Emulation dropdown menu.

Step 10: Click <OK>.

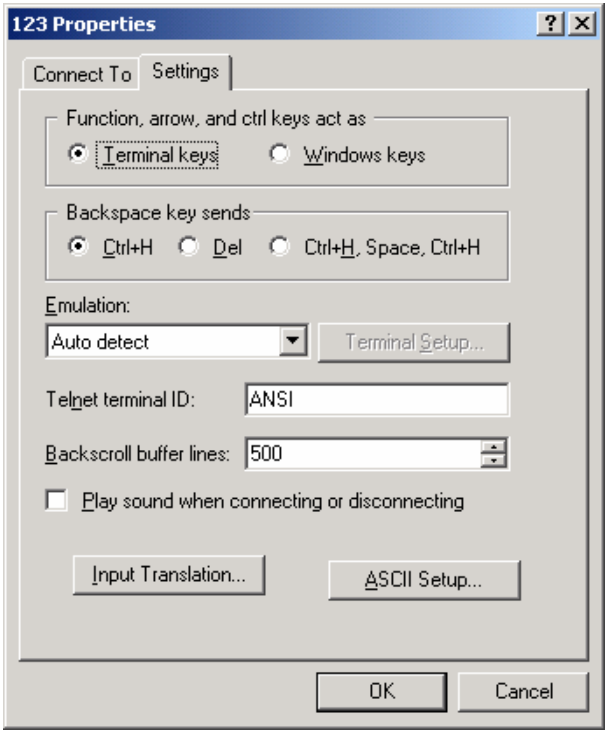

Figure 3-5 Setting the terminal type

3.1.2 Powering on the Router

After the router is powered on, the Boot Rom program runs first and the following system information appears on the terminal screen:

```
System starts booting...(V10.50)


**************************************************
*                                                *
```

```
*       H3C Series Routers Boot Rom V15.00       *
*                                                *
**************************************************

  Copyright(c) 2004-2006 Hangzhou H3C Tech. Co., Ltd.
  Compiled at Tue Mar 28 14:58:33 CST 2006

   Testing memory...OK!
   256M bytes DDR SDRAM Memory
   16M  bytes Flash Memory
   Hardware Version is 4.0
   CPLD     Version is 1.0
  Press Ctrl-B to enter Boot Menu
```

Press <Enter>. The system displays (if login authentication is not enabled):

```
<H3C>
```

This prompt indicates that the router enters system view, and is ready for configuration.

3.2 Maintaining the Router

3.2.1 Boot Menu (8 MB Flash Is Installed)

The AR 18-21/18-22/18-22-8/18-23-1 has an 8MB flash.

Start the router. When the information “Press Ctrl-B to enter Boot Menu” appears on the terminal screen, press <Ctrl+B>. The system displays:

```
Please  input Boot Rom password :
```

Caution:

- Press <Ctrl+B> within three seconds after the prompt “Press Ctrl-B to Enter Boot Menu...?” appears to enter the Boot Menu. Otherwise, the system starts decompressing the program.
- If you want to enter the Boot menu after the system starts decompressing the program, you need to reboot the router.

Type the correct password and press <Enter>. (If no Boot Rom password is configured, just press <Enter>.) The system accesses the following Boot menu:

```
Boot Menu:
1:  Download application program with XMODEM
2:  Download application program with NET
3:  Start up and ignore configuration
4:  Enter debugging environment
5:  Boot Rom Operation Menu
6:  Do not check the version of the software
7:  Exit and reboot
Enter your choice(1-7):
```

Note that:

1) To download an application program through XModem, see 3.2.3 Upgrading Programs through XModem.

2) To download an application program through Ethernet, select <2>. This menu appears:

```
Net Port Download Menu:
1:  Change Net Parameter
2:  Download From Net
3:  Exit to Main Menu
Enter your choice(1-3):1
```

- Select <1> to change the parameters for downloading. The following information is displayed:

```
Change Boot Parameter:
'.' = clear field;  '-' = go to previous field;  ^D = quit
boot device          : mot fccl
processor number     : 0
host name            : 8040
file name            : M8240ram.arj
inet on ethernet (e) : 169.254.10.10
inet on backplane (b):
host inet (h)        : 169.254.10.11
gateway inet (g)     :
user (u)             : 8040
ftp password (pw) (blank = use rsh):
flags (f)            : 0x0
target name (tn)     :
startup script (s)   :
other (o)            :
```

Note:

You can change the parameter settings behind the colons (:). The “boot device” field is “motfcc1” for AR 18-2X routers.

The AR 18-2X allows you to download programs through both TFTP and FTP. For the procedures, see the section 3.2.5 "Upgrading Boot ROM at CLI".

- After you set the parameters, select <2> to start downloading.
- Select <3> to exit to the main menu.

3) Start up and ignore the configuration file.

4) Enter debugging environment for troubleshooting.

Caution:

Upgrade router software only when necessary and with help of engineers. When doing that, make sure that the Boot Rom software version can work with the version of the adopted application program.

5) Enter the Boot Rom submenu.

The Boot Rom submenu is displayed:

```
Boot Rom Download Menu:
     1:  Download Boot Rom with XModem
     2:  Download Extended Segment of Boot Rom with XModem
```

```
3:  Restore Extended Segment of Boot Rom from FLASH
4:  Backup Extended Segment of Boot Rom to FLASH
5:  Exit to Main Menu
Enter your choice(1-5):
```

The menu provides approaches to Boot Rom upgrade, backup, and recovery. See the sections “3.2.3 Upgrading Programs through XModem” and “3.2.4 Backing up and Restoring the Extended Segment of the Boot Rom Program” for the procedures.

6) Have the system ignore the software version of the Boot Rom program, its extended segment, and application program for backward compatibility. If you fail to upgrade the software because the system considers that you are using an “invalid version” even when the correct version is used, you can use this option to ignore the version check during software upgrading. Note that this option works only once after you select it. Then, the system resumes version check at reboot.
7) Exit and reboot the router.

3.2.2 Boot Menu (16 MB Flash Is Installed)

The AR 18-22S-8/AR 18-23S-1 has a 16MB flash.

Start the router. When the information “Press Ctrl-B to enter Boot Menu” appears on the terminal screen, press <Ctrl+B>. The system displays:

```
Please  input Boot Rom password :
```

Caution:

- Press <Ctrl+B> within three seconds after the prompt “Press Ctrl-B to Enter Boot Menu...?” appears to enter the Boot Menu. Otherwise, the system starts decompressing the program.
- If you want to enter the Boot menu after the system starts decompressing the program, you need to reboot the router.

Type the correct password and press <Enter>. (If no Boot Rom password is configured, just press <Enter>.) The system accesses the Boot Menu:

```
Boot Menu:
     1:  Download application program with XMODEM
     2:  Download application program with NET
     3:  Set application file type
     4:  Display applications in Flash
     5:  Clear application password
     6:  Start up and ignore configuration
     7:  Enter debugging environment
     8:  Boot Rom Operation Menu
     9:  Do not check the version of the software
     a:  Exit and reboot
    Enter your choice(1-a):
```

1) Download an application program through XModem. For more information, see 3.2.3 Upgrading Programs through XModem

2) Download an application through Ethernet. After you select this option, the screen displays this menu:

```
Net Port Download Menu:
1:  Change Net Parameter
2:  Download From Net
3:  Exit to Main Menu
Enter your choice(1-3):1
```

3) Set the type of the application file used at startup

The dual image function is available with the router when it is installed with a 16 MB or larger Flash. By default, the system defines and attempts to boot in order with three boot files main, backup, and secure, if they have been loaded to Flash. You can select this option to change the order or startup file. If it fails to boot with the secure boot file, it prompts boot failure.

The following table gives default names and types of the boot files.

Table 3-1 Default names and types of the boot files

Boot file	File name	File type
Main boot file	main.bin	M
Backup boot file	backup.bin	B
Secure boot file	secure.bin	S

Note that:

- The application images for system boot can be type M, B, or S, but not type N/A (not type M, B, or S). You can store them in Flash memory, but only one for each. For example, if an

M+B (that is, both of type M and B) file exists, it is impossible to have another M or B file. If you change the file type of another file to B, the M+B file becomes a type M file.

- You can modify the file name of an application image in Flash memory using the command after it boots. For more information, refer to *Comware V3 Operation Manual – System Management*.
- You cannot modify the file type of the type S application image file, but you can modify the file type of type M or B and N/A application image files in the Boot Rom menu or using commands after the application image boots.
- Secure boot file is the last system boot resort. You can download it in the Boot Rom menu and must name it secure.bin. However, you cannot modify this file or change the type of another file to S. If you change the name of the secure boot file with the **rename** command after the system boots, the file is removed from Flash memory. To use the secure boot file after that, you need to download it again.

For example, after you select option **3** from Boot Menu, the console screen displays a menu similar to the following:

```
    M=MAIN       B=BACKUP       S=SECURE
******************************************************
*************
NO.   Name         Size      Type         Time
1    main.bin      5988025    M       Oct/10/2005 10:10:10
2   backup.bin   5985198     B       Oct/10/2005 10:10:10
******************************************************
3      Exit to main menu
Enter your choice(1-5):    2
```

Select option **2**. The system enters the following menu, where you can change the file type of backup.bin.

```
Set this file as:
1.   Main
2.   Backup
3.   Exit
Enter your choice(1-3):   1
```

Select option **1** for example to specify the backup.bin file as the main boot file. After the modification takes effect, the file type of the original main file named main.bin changes to N/A, while the file type of the backup.bin changes to M+B. Now, the backup.bin file is the first boot file.

4) Display applications in Flash memory.

Select option **4**. The console screen displays:

```
    M=MAIN       B=BACKUP       S=SECURE
******************************************************
NO.   Name         Size      Type        Time
1   main.bin    5988025     N/A       Oct/10/2005 10:10:10
2   backup.bin  5985198     M+B       Oct/10/2005 10:10:10
******************************************************
3     Exit to main menu
```

Where, you can see that the type of backup.bin is now M+B.

Press <Enter> to return to Boot Menu.

5) Clear application password

You may use this option to clear the password of super user. This is a one-time operation however; you must undergo authentication at reboot.

6) Start up with the initial configuration, ignoring the configuration file.

In case the password is lost, you can use this option to ignore the existing configuration and access the router with the initial configuration. Then you can change the password. To have the router start up with the new configuration file at next boot, however, you must save the configuration after you change the password.

7) Enter the debugging environment

8) Enter the Boot Rom submenu

The Boot Rom submenu is displayed:

```
Boot ROM Download Menu:
     1:  Download Boot Rom with XModem
     2:  Download Extended Segment of Boot Rom with XModem
     3:  Restore Extended Segment of Boot Rom from FLASH
     4:  Backup Extended Segment of Boot Rom to FLASH
     5:  Exit to Main Menu
     Enter your choice(1-5):
```

The menu provides approaches to Boot Rom upgrade, backup, and recovery.

9) Ignore software version for backward compatibility.

In case you fail to upgrade software because the system considers that you are using an “invalid version” even when the correct version is used, you can have the system ignore version check on Boot Rom application, its extended segment, and application. This is a one-time operation, however; the router checks version again at reboot.

10) Exit and reboot

3.2.3 Upgrading Programs through XModem

When you upgrade software through XModem, you can do that using the console port without having to set up another configuration environment.

I. Upgrading an application program

Step 1: Enter the Boot menu and press <1> to download an application program using XModem. The following download speeds are available for the router:

```
Downloading application program from serial ...
Please choose your download speed:
1: 9600 bps
2: 19200 bps
3: 38400 bps
4: 57600 bps
5: 115200 bps
6: Exit and reboot
Enter your choice(1-6):
```

Step 2: Select an appropriate download speed (for example, 115200 bps by entering <5>). The following message appears:

```
Download speed is 115200 bps. Change the terminal's speed
to 115200 bps, and select XModem protocol. Press ENTER key
when ready.
```

Step 3: Change your terminal's baud rate to the same baud rate for software downloading (115200 bps in this example). After that, disconnect the terminal ([Dial-in/Disconnect]), reconnect it ([Dial-in/Dialing]), and press <Enter> to start downloading. The system displays:

```
Downloading ... CCCCC
```

Note:

The new baud rate takes effect only after you reconnect the terminal emulation program.

Step 4: Select [Transmit/send file] in the terminal window. The following dialog box pops up:

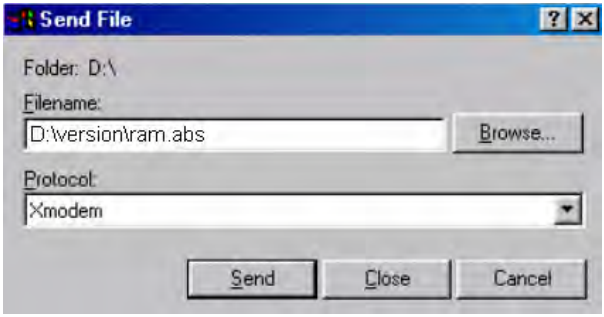

Figure 3-6 Send File dialog box

Step 5: Click <Browse>. Select the application file to be downloaded and set protocol to XModem. Click <Send>. The following interface pops up:

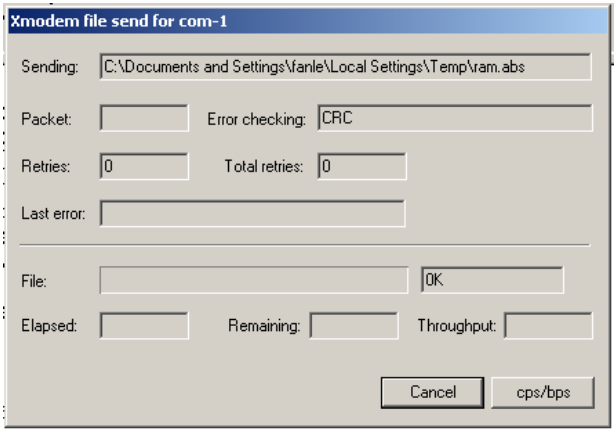

Figure 3-7 Sending file interface

Step 6: After completing downloading, the system begins writing data to the Flash, and then displays the following information in the terminal interface, indicating completion of the downloading:

```
Download completed.
  Writing to flash memory...
  Please wait,it needs a long time .Please wait...
############################################################
Writing FLASH Success.

  Please use 9600 bps.Press <ENTER> key to reboot the
system.
```

Restore the speed of the console terminal to 9600 bps as prompted, disconnect and reconnect the terminal. The system starts up normally.

II. Upgrading the Boot Rom program

Step 1: Enter the Boot Menu, and then select <7> to enter the Boot Rom operation sub-menu.

Step 2: Enter <1> in the Boot Rom operation sub-menu to upgrade the Boot Rom program using XModem. Several speed options are available for you. The subsequent steps are the same as those described in “I. Upgrading an application program” of this section.

 **Caution:**

You cannot restore the Boot Rom program on site if you fail to upgrade the entire Boot Rom program. Therefore, you must not upgrade the entire Boot Rom program unless necessary and with help of engineers.

III. Upgrading the extended segment of the Boot ROM program

Step 1: Enter the Boot Menu, and then select <7> to enter the Boot Rom operation sub-menu.

Step 2: Select <2> in the operation sub-menu to upgrade the extended segment of the Boot Rom program using XModem. Several speed options are available for you. The subsequent steps are the same as those described in "I. Upgrading an application program" of this section.

Caution:

This upgrade approach is only used to upgrade a portion of the Boot Rom program, so you can make a second attempt once errors occur.

3.2.4 Backing up and Restoring the Extended Segment of the Boot Rom Program

I. Backing up the extended segment of the Boot ROM program to the Flash

Follow these steps to back up the extended segment of the Boot Rom:

Step 1: Enter the Boot menu, and then select <7> to enter the Boot Rom operation sub-menu.

Step 2: Select <4> in the sub-menu to copy the current extended segment of the Boot Rom program to the Flash.

If the backup attempt is successful, the following message appears:

```
Writing to FLASH.Please wait...####
```

```
Backuping Boot ROM program to FLASH successed!
```

Step 3: When the sub-menu appears again, select <5> to exit and reboot the router.

II. Restoring the extended segment of the Boot Rom program from the Flash

If faults occur to the extended segment of the Boot Rom or you upgrade it mistakenly, you can restore the extended segment of the Boot Rom from the Flash to the Boot Rom by taking these steps:

Step 1: Enter the Boot Menu, and then select <7> to enter the Boot Rom operation sub-menu.

Step 2: Select <3> in the operation sub-menu to restore the extended segment of the Boot Rom from the Flash.

If the operation is successful, the system displays:

```
Writing to Boot Rom.Please wait...######
Restoring Boot Rom program successed!
```

Step 3: When the sub-menu appears again, select <5> to exit and reboot the router.

3.2.5 Upgrading Boot ROM at CLI

After the router starts normally, you can upgrade and back up application programs, and backup and restore the configuration at the command line interface (CLI)

I. Upgrading Boot ROM Through TFTP

1) Connect the TFTP server to the router on which Boot ROM is to be upgraded so that they can communicate with each

other. A TFTP server is a device running the TFTP server program.

2) Specify the path on the TFTP server to the folder that contains the Boot ROM upgrade file. That is, ensure the Boot ROM upgrade file are available in the Base Directory folder, as shown in Figure 3-8 (For different TFTP server software packages, the interfaces differ).

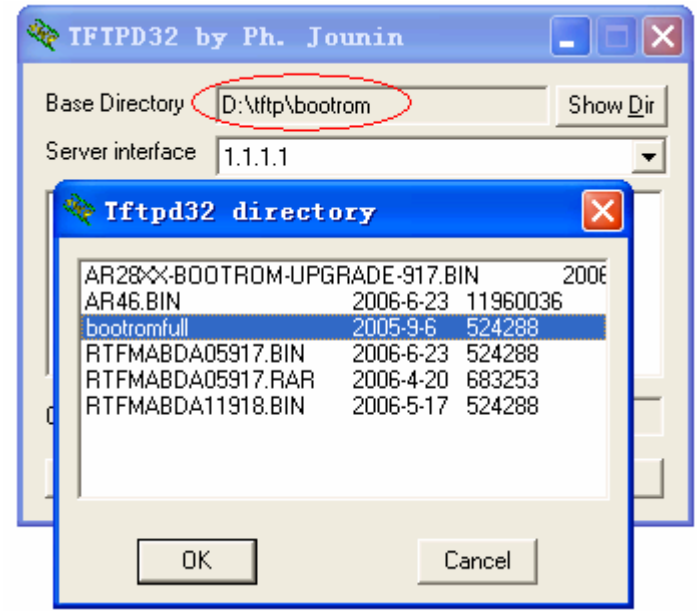

Figure 3-8 TFTP server program interface

3) Configure the router to download the Boot ROM upgrade file from the TFTP server.

```
<H3C> tftp 1.1.1.1 get bootromfull
```

As shown in the above display, 1.1.1.1 is the IP address of the TFTP server, and bootromfull is the Boot ROM upgrade file.

4) Execute the following command on the router to upgrade Boot ROM.

```
<H3C> system-view
[H3C] upgrade bootrom full
  WARNING: This operation will update the Boot ROM.
           It may result in booting failure.
  Caution!!! upgrade bootrom [Y/N]?y
  Please wait, it may take a long time
  The upgrade succeeds!
```

5) After the upgrade operation is complete, restart the router so that the upgrade made to the Boot ROM takes effect. After the router is restarted, you can use the **display version** command to display the current Boot ROM version, or directly enter the Boot ROM menu, so as to verify the upgrade operation.

II. Upgrading Boot ROM Through FTP

1) Connect the FTP server to the router on which Boot ROM is to be upgraded so that they can communicate with each other. An FTP server is a device running the FTP server program.
2) Specify the path on the FTP server to the folder that contains the Boot ROM upgrade file, and set the username and password. As shown in Figure 3-9, configure the username in the Profile text box and set a password. Make sure the currently configured path contains the Boot ROM upgrade

file. (For different FTP server software packages, the interfaces differ).

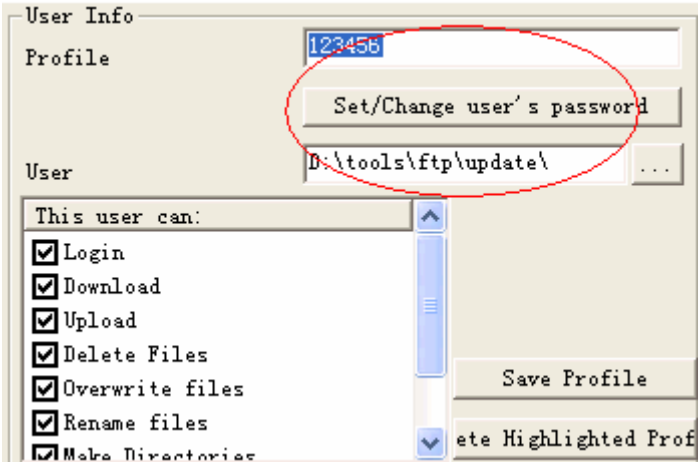

Figure 3-9 FTP server program interface

3) Configure the router to download the Boot ROM upgrade file from the FTP server.

```
<H3C> ftp 1.1.1.1
Trying 1.1.1.1 ...
Press CTRL+K to abort
Connected to 1.1.1.1.
220 3Com 3CDaemon FTP Server Version 2.0
User(1.1.1.1:(none)):guest        //Enter the username
configured on the FTP server.
331 User name ok, need password
Password:                      // Enter the corresponding
password.
230 User logged in//The connection is established
```

```
successfully.
[ftp] get bootromfull
```

4) Execute the following command on the router to upgrade Boot ROM.

```
<H3C> system-view
[H3C] upgrade bootrom full
  WARNING: This operation will update the Boot ROM.
           It may result in booting failure.
  Caution!!! upgrade bootrom [Y/N]?y
  Please wait, it may take a long time
  The upgrade succeeds!
```

5) After the upgrade operation is complete, restart the router so that the upgrade made to the Boot ROM takes effect. After the router is restarted, you can use the **display version** command to display the current Boot ROM version, or directly enter the Boot ROM menu, so as to verify the upgrade operation.

3.2.6 Upgrading Application Programs with NET

Upgrading an application program with net is to download the application program through an Ethernet interface. In this approach, the router is a client that needs to be connected to a TFTP or FTP server through one of its fixed Ethernet interfaces.

Caution:

The AR 18-2X series does not provide any TFTP or FTP server program. You need to purchase and install one by yourself.

Follow these steps to upgrade an application program through TFTP or FTP:

1) Start the TFTP or FTP server

Start the TFTP or FTP server on the PC connected to the Ethernet interface on the router and set the path to the file that is to be downloaded. For the FTP server, you must also set username and password.

2) Enter the Boot Menu and select <2> to download with NET
3) In the NET download menu, select <1> to enter the parameter configuration interface.

- To upgrade through TFTP, you need to provide values to these parameters:

file name: name of the file to be loaded.

inet on ethernet (e): IP address of the interface used for downloading on the router

host inet (h): IP address of the TFTP server

flags (f): set to **0x80**

- To upgrade through FTP, you need to provide values for these parameters:

file name: name of the file to be loaded.

inet on ethernet (e): IP address of the interface used for downloading on the router

host inet (h): IP address of the FTP server

user (u): username, same as the one configured on the FTP server

ftp password (pw) (blank = use rsh): password, same as the one configured on the FTP server

flags (f): set to **0x0**

These values are automatically saved after you configure them.

4) Press <Enter>. In the NET downloading menu, select <2>. The following message appears:

```
boot device          : motfccl
unit number          : 0
processor number     : 0
host name            : 8040
file name            : Q8040.BIN
inet on ethernet (e) : 10.110.27.235
host inet (h)        : 10.110.27.231
user (u)             : 8040
ftp password (pw)    : 8040
flags (f)            : 0x80

Attached TCP/IP interface to motfccl.
Subnet Mask: 0xfffff800
Attaching network interface lo0... done.
  Loading...
  NET download completed...
  read len = [06298000]
```

```
  Please wait,it needs a long time
############################################################
############################
  Writing Comwaresoftware File Succeeds!
  Press <Enter> key to reboot the system .
```

Press <Enter> as prompted to have the router reboot.

Table of Contents

Chapter 4 Troubleshooting

4.1 Troubleshooting the Power System

Symptoms:

POWER LED cannot light.

Solution:

Check that:

- The power switch of the router is turned on.
- The switch of the power source is turned on.
- The power cord of the router is properly connected.
- The correct power source is used.

⚠ **Caution:**

Do not plug/unplug the power cord when power is being supplied. If POWER LED is still OFF after you check against the items listed above, contact your agent.

4.2 Troubleshooting the Configuration System

If the router is operating normally after it is powered on, it displays the start-up information on the console terminal. If the configuration system has faults, it displays illegible characters or nothing at all.

Symptoms 1:

Nothing is displayed on the terminal screen after the router is powered on.

Solution:

Step 1: Check that:

- The power system is correctly working.
- The console cable is connected correctly.

Step 2: Check the console cable and the terminal (such as the HyperTerminal) parameter settings.

Symptoms 2:

Illegible characters are displayed on the console terminal after the router is powered on.

Solution:

Make sure you have set on your terminal (HyperTerminal):

Baud rate = 9600

Databit = 8

Parity check = none

Stopbit = 1

Flow control = none

Terminal emulation = VT100

Reconfigure the parameters if their values are different.

4.3 Recovering/Replacing a Lost Boot Rom Password

If the Boot Rom password of the router is lost, contact the local agent of H3C for help.